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CLAIMS

[Claim(s)]
[Claim 1]Viscosity is a sealed type lead acid battery of structure which obturates a pole pillar portion connected to a polar plate at 25 **, thermosetting resin, i.e., a bulking agent, more than 10 Pa.s or whose gel time is 20 or less minutes at 25 **, A manufacturing method of a sealed type lead acid battery which obturates said pole pillar portion which heated said pole pillar portion beforehand and raised temperature before pouring in said bulking agent with said bulking agent.
[Claim 2]A manufacturing method of the sealed type lead acid battery according to claim 1 which raises temperature of a pole pillar portion to 40 ** - 100 ** temporarily by heating a pole pillar portion before pouring in a bulking agent.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]Especially this invention relates to the manufacturing method of the sealed type lead acid battery used for the power supply of noncommercial porter pull apparatus etc. about the manufacturing method of a sealed type lead acid battery.
[0002]
[Description of the Prior Art]Many of sealed type lead acid batteries are maintaining the sealing nature of the pole pillar portion which is a portion which takes out the electrical and electric equipment from the inside of a cell by filling up the circumference with a bulking agent. When the portion which air bubbles etc. remain to the circumference of a pole pillar, and is not filled up into it with a bulking agent exists, the obturation nature of a pole pillar portion with a large portion with which it does not fill up falls. Viscosity used low resin with long gel time for the bulking agent so that it might harden, after the circumference of a pole pillar was fully conventionally filled up with the thermosetting resin which is a bulking agent.
[0003]
[Problem(s) to be Solved by the Invention]However, in the conventional manufacturing method, viscosity is low, gel time was long, i.e., the state where viscosity was low could adopt only long resin as a bulking agent before hardening, but not only the reliability of a pole pillar portion but the manufacturing ease of making had to be enough taken into consideration, and had to choose the kind of bulking agent. Since the viscosity of a bulking agent became high depending on the surrounding temperature and humidity or moisture adhered to a pole pillar portion, there was also a fault that the wettability to the pole pillar of a bulking agent and the case of a pole pillar portion fell. In the design of a lead storage battery, size sufficient between a pole pillar and a pole pillar partial case needed to be secured so that air bubbles might not remain in the circumference of a pole pillar. About a bulking agent with low viscosity, when the raw material of low molecular weight was used, cost was high, and when it diluted with a diluent too much, there was also a problem that adhesive strength and sulfuric acid-proof nature fell.
[0004]This invention solves the above-mentioned conventional problem, the width of selection of a bulking agent kind is expanded, and influence of the surrounding temperature and humidity is not received, but it aims at providing the manufacturing method of the sealed type lead acid battery which can make smaller the size between a pole pillar and a pole pillar partial case.
[0005]
[Means for Solving the Problem]In order to solve this technical problem, a manufacturing method of a sealed type lead acid battery by this invention, Viscosity is a sealed type lead acid battery of structure which obturates a pole pillar portion connected to a polar plate at 25 **, thermosetting resin, i.e., a bulking agent, more than 10 Pa.s or whose gel time is 20 or less minutes at 25 **, Before pouring in a bulking agent, the blockade mouth of the pole pillar portion which heated a pole

pillar portion beforehand and raised temperature is carried out with a bulking agent.
[0006]
[Function]Since it is maintained by the manufacturing method of this sealed type lead acid battery while the temperature of a bulking agent has been high even if a bulking agent contacts a pole pillar part at the time of bulking agent pouring, it becomes possible to raise the wettability of a bulking agent and a pole pillar portion, and air bubbles become difficult to remain. In order to evaporate the excess water adhering to a pole pillar and a pole pillar partial case, the wettability over the bulking agent by the side of adherend also improves. Therefore, since restoration of a pole pillar portion can be performed without air bubbles etc. remaining to the circumference of a pole pillar even if viscosity is high or gel time uses a short bulking agent, the width of selection of a bulking agent becomes large. It becomes unnecessary therefore, to be able to choose a bulking agent kind as a subject only for reliability, for low-cost-izing to be possible, to increase the addition of a diluent, and to reduce adhesive strength and sulfuric acid-proof nature. Offer of the cell of the structure around which a bulking agent with a small size between a pole pillar and a pole pillar partial case cannot turn easily is also attained.
[0007]
[Example]Hereafter, the manufacturing method of the sealed type lead acid battery of one example of this invention is explained using a drawing.
[0008]The resin a, the resin b, and the resin c were used for the circumference of the pole pillar 2a connected to the polar plate 2 of the cell of structure as shown in drawing 1 as the bulking agent 4, and it made 2000 cells at a time as an experiment. The resin a is [4.3Pa.s and gel time] 15 minutes in viscosity at 25 ** in 25 **. The resin b is [15Pa.s and gel time] 30 minutes in viscosity at 25 ** in 25 **. The resin c is [3.5Pa.s and gel time] 40 minutes in viscosity at 25 ** in 25 **. 2.0-mm-thick polypropylene was used as a material of the armor body of a cell, and the pole pillar partial case 1. 3 is a connection section of a terminal and a pole pillar. The cell of drawing 1 set length a between the pole pillar partial case 1 and the pole pillar 2a to 1.0 mm. About each resin, 100 cells neglected the cell for 30 minutes before bulking agent pouring in 30, 40, 50, 60, 70, and 80 or 90,100,120 ** atmosphere, respectively, and poured in the bulking agent 4 within 30 seconds after extraction. The bulking agent 4 kept it warm at 40 **. Among these resin, conventionally, since viscosity is high, the resin b is the resin which canceled adoption. About the 100 remaining cells, the cell was made as an experiment by the conventional method. It calculated the defective fraction by the cell made as an experiment having deleted 30 cells of sections at a time, and having made poor that to which the air bubbles 5 touch the pole pillar 2a. An example to which air bubbles touch the pole pillar 2a is shown in drawing 2. About the 70 remaining cells, the heat shock examination was in the electrolysis solution of a pole pillar portion operation and one month afterward, and the existence of the liquid leakage by stage fright was checked. The result of a cellular defective fraction, the liquid leakage incidence rate after a heat shock examination, and the temperature of the pole pillar partial case 1 at the time of bulking agent pouring is shown in Table 1. Although a heat shock examination differs from actual use conditions, it is effective in performing the ratio of a result as an accelerated test.
[0009]
[Table 1]

加熱温度	充填剤注入時電池温度	加熱後外観	気泡不良率			ヒートショック試験後の液漏れ		
			樹脂a	樹脂b	樹脂c	樹脂a	樹脂b	樹脂c
加熱なし	20～25℃	問題なし	4/30	9/30	2/30	1/70	2/70	3/70
30℃	25～27℃	問題なし	2/30	5/30	1/30	1/70	1/70	3/70
40℃	33～35℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
50℃	40～44℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
60℃	47～51℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
70℃	53～55℃	問題なし	0/30	0/30	0/30	0/70	0/70	1/70
80℃	61～65℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
90℃	70～75℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
100℃	79～83℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
120℃	93～98℃	ｹｰｽ変形 2/300	0/30	0/30	0/30	0/70	0/70	0/70

[0010]According to the result of Table 1, in the case of cooking temperature 30 ** or less of each resin, cellular remains are seen. Only in the case of cooking temperature 30 ** or less, in the resin a and the resin b, liquid leakage is seen after a heat shock examination. All five cells were [the cellular remains of the pole pillar part of these cells] the causes. In the resin c, the liquid leakage of a cause did not have air bubbles. When heating over 100 ** was performed, modification of a resin case was seen.

[0011]Also in a fuel cell subsystem with a small size between the pole pillar and the pole pillar partial case 1 where many air bubbles remain by the conventional method by the above result, Even if it used the bulking agent with high viscosity, and the bulking agent with short gel time by heating a pole pillar portion beforehand before pouring of a bulking agent, the cell by which air bubbles do not remain around a pole pillar was able to be made. Therefore, the width of selection of a bulking agent spread and it has checked that a cell with the higher obturation reliability of a pole pillar portion could be obtained. However, since the temperature of resin which can be heated changes with the kind and grades of resin of a case material, it needs to be careful of cooking temperature enough, and a fuel cell subsystem needs to determine it.

[0012]

[Effect of the Invention]By explanation of the above example, according to the manufacturing method of the sealed type lead acid battery of this invention, so that clearly. Since it is maintained while the temperature of a bulking agent has been high even if the bulking agent at the time of bulking agent pouring contacts a pole pillar part, it becomes possible to inject a bulking agent into a pole pillar portion in the state where viscosity is low, and since the wettability of a pole pillar and a bulking agent improves, ****** becomes difficult to remain. In order to evaporate the excess water adhering to a pole pillar and a pole pillar partial case, the wettability over the bulking agent by the side of adherend also improves. Therefore, since restoration of a pole pillar portion can be

performed without air bubbles etc. remaining to the circumference of a pole pillar even if viscosity is high or gel time uses a short bulking agent, It becomes unnecessary for the width of selection of a bulking agent to spread, and to attain low cost-ization, and to increase a diluent addition, and to reduce adhesive strength and sulfuric acid-proof nature. Offer of the cell of the structure around which a bulking agent with a small size between a pole pillar and a pole pillar partial case cannot turn easily is also attained.

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TECHNICAL FIELD

[Industrial Application]Especially this invention relates to the manufacturing method of the sealed type lead acid battery used for the power supply of noncommercial porter pull apparatus etc. about the manufacturing method of a sealed type lead acid battery.

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PRIOR ART

[Description of the Prior Art]Many of sealed type lead acid batteries are maintaining the sealing nature of the pole pillar portion which is a portion which takes out the electrical and electric equipment from the inside of a cell by filling up the circumference with a bulking agent. When the portion which air bubbles etc. remain to the circumference of a pole pillar, and is not filled up into it with a bulking agent exists, the obturation nature of a pole pillar portion with a large portion with which it does not fill up falls. Viscosity used low resin with long gel time for the bulking agent so that it might harden, after the circumference of a pole pillar was fully conventionally filled up with the thermosetting resin which is a bulking agent.

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EFFECT OF THE INVENTION

[Effect of the Invention]By explanation of the above example, according to the manufacturing method of the sealed type lead acid battery of this invention, so that clearly. Since it is maintained while the temperature of a bulking agent has been high even if the bulking agent at the time of bulking agent pouring contacts a pole pillar part, it becomes possible to inject a bulking agent into a pole pillar portion in the state where viscosity is low, and since the wettability of a pole pillar and a bulking agent improves, ****** becomes difficult to remain. In order to evaporate the excess water adhering to a pole pillar and a pole pillar partial case, the wettability over the bulking agent by the side of adherend also improves. Therefore, since restoration of a pole pillar portion can be performed without air bubbles etc. remaining to the circumference of a pole pillar even if viscosity is high or gel time uses a short bulking agent, It becomes unnecessary for the width of selection of a bulking agent to spread, and to attain low cost-ization, and to increase a diluent addition, and to reduce adhesive strength and sulfuric acid-proof nature. Offer of the cell of the structure around which a bulking agent with a small size between a pole pillar and a pole pillar partial case cannot turn easily is also attained.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, in the conventional manufacturing method, viscosity is low, gel time was long, i.e., the state where viscosity was low could adopt only long resin as a bulking agent before hardening, but not only the reliability of a pole pillar portion but the manufacturing ease of making had to be enough taken into consideration, and had to choose the kind of bulking agent. Since the viscosity of a bulking agent became high depending on the surrounding temperature and humidity or moisture adhered to a pole pillar portion, there was also a fault that the wettability to the pole pillar of a bulking agent and the case of a pole pillar portion fell. In the design of a lead storage battery, size sufficient between a pole pillar and a pole pillar partial case needed to be secured so that air bubbles might not remain in the circumference of a pole pillar. About a bulking agent with low viscosity, when the raw material of low molecular weight was used, cost was high, and when it diluted with a diluent too much, there was also a problem that adhesive strength and sulfuric acid-proof nature fell.
[0004]This invention solves the above-mentioned conventional problem, the width of selection of a bulking agent kind is expanded, and influence of the surrounding temperature and humidity is not received, but it aims at providing the manufacturing method of the sealed type lead acid battery which can make smaller the size between a pole pillar and a pole pillar partial case.

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MEANS

[Means for Solving the Problem]In order to solve this technical problem, a manufacturing method of a sealed type lead acid battery by this invention, Viscosity is a sealed type lead acid battery of structure which obturates a pole pillar portion connected to a polar plate at 25 **, thermosetting resin, i.e., a bulking agent, more than 10 Pa.s or whose gel time is 20 or less minutes at 25 **, Before pouring in a bulking agent, the blockade mouth of the pole pillar portion which heated a pole pillar portion beforehand and raised temperature is carried out with a bulking agent.

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OPERATION

[Function]Since it is maintained by the manufacturing method of this sealed type lead acid battery while the temperature of a bulking agent has been high even if a bulking agent contacts a pole pillar part at the time of bulking agent pouring, it becomes possible to raise the wettability of a bulking agent and a pole pillar portion, and air bubbles become difficult to remain. In order to evaporate the excess water adhering to a pole pillar and a pole pillar partial case, the wettability over the bulking agent by the side of adherend also improves. Therefore, since restoration of a pole pillar portion can be performed without air bubbles etc. remaining to the circumference of a pole pillar even if viscosity is high or gel time uses a short bulking agent, the width of selection of a bulking agent becomes large. It becomes unnecessary therefore, to be able to choose a bulking agent kind as a subject only for reliability, for low-cost-izing to be possible, to increase the addition of a diluent, and to reduce adhesive strength and sulfuric acid-proof nature. Offer of the cell of the structure around which a bulking agent with a small size between a pole pillar and a pole pillar partial case cannot turn easily is also attained.

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EXAMPLE

[Example]Hereafter, the manufacturing method of the sealed type lead acid battery of one example of this invention is explained using a drawing.
[0008]The resin a, the resin b, and the resin c were used for the circumference of the pole pillar 2a connected to the polar plate 2 of the cell of structure as shown in drawing 1 as the bulking agent 4, and it made 2000 cells at a time as an experiment. The resin a is [4.3Pa.s and gel time] 15 minutes in viscosity at 25 ** in 25 **. The resin b is [15Pa.s and gel time] 30 minutes in viscosity at 25 ** in 25 **. The resin c is [3.5Pa.s and gel time] 40 minutes in viscosity at 25 ** in 25 **. 2.0-mm-thick polypropylene was used as a material of the armor body of a cell, and the pole pillar partial case 1. 3 is a connection section of a terminal and a pole pillar. The cell of drawing 1 set length a between the pole pillar partial case 1 and the pole pillar 2a to 1.0 mm. About each resin, 100 cells neglected the cell for 30 minutes before bulking agent pouring in 30, 40, 50, 60, 70, and 80 or 90,100,120 ** atmosphere, respectively, and poured in the bulking agent 4 within 30 seconds after extraction. The bulking agent 4 kept it warm at 40 **. Among these resin, conventionally, since viscosity is high, the resin b is the resin which canceled adoption. About the 100 remaining cells, the cell was made as an experiment by the conventional method. It calculated the defective fraction by the cell made as an experiment having deleted 30 cells of sections at a time, and having made poor that to which the air bubbles 5 touch the pole pillar 2a. An example to which air bubbles touch the pole pillar 2a is shown in drawing 2. About the 70 remaining cells, the heat shock examination was in the electrolysis solution of a pole pillar portion operation and one month afterward, and the existence of the liquid leakage by stage fright was checked. The result of a cellular defective fraction, the liquid leakage incidence rate after a heat shock examination, and the temperature of the pole pillar partial case 1 at the time of bulking agent pouring is shown in Table 1. Although a heat shock examination differs from actual use conditions, it is effective in performing the ratio of a result as an accelerated test.
[0009]
[Table 1]

加熱温度	充填剤注入時電池温度	加熱後外観	気泡不良率			ヒートショック試験後の液漏れ		
			樹脂a	樹脂b	樹脂c	樹脂a	樹脂b	樹脂c
加熱なし	20～25℃	問題なし	4/30	9/30	2/30	1/70	2/70	3/70
30℃	25～27℃	問題なし	2/30	5/30	1/30	1/70	1/70	3/70
40℃	33～35℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
50℃	40～44℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
60℃	47～51℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
70℃	53～55℃	問題なし	0/30	0/30	0/30	0/70	0/70	1/70
80℃	61～65℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
90℃	70～75℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
100℃	79～83℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
120℃	93～98℃	ｹｰｽ変形 2/300	0/30	0/30	0/30	0/70	0/70	0/70

[0010]According to the result of Table 1, in the case of cooking temperature 30 ** or less of each resin, cellular remains are seen. Only in the case of cooking temperature 30 ** or less, in the resin a and the resin b, liquid leakage is seen after a heat shock examination. All five cells were [the cellular remains of the pole pillar part of these cells] the causes. In the resin c, the liquid leakage of a cause did not have air bubbles. When heating over 100 ** was performed, modification of a resin case was seen.

[0011]Also in a fuel cell subsystem with a small size between the pole pillar and the pole pillar partial case 1 where many air bubbles remain by the conventional method by the above result, Even if it used the bulking agent with high viscosity, and the bulking agent with short gel time by heating a pole pillar portion beforehand before pouring of a bulking agent, the cell by which air bubbles do not remain around a pole pillar was able to be made. Therefore, the width of selection of a bulking agent spread and it has checked that a cell with the higher obturation reliability of a pole pillar portion could be obtained. However, since the temperature of resin which can be heated changes with the kind and grades of resin of a case material, it needs to be careful of cooking temperature enough, and a fuel cell subsystem needs to determine it.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]The sectional view near the pole pillar portion of the cell in the manufacturing method of the sealed type lead acid battery of one example of this invention
[Drawing 2]The sectional view near the pole pillar portion of the cell in which an example to which air bubbles touch the pole pillar in the manufacturing method of the conventional sealed type lead acid battery is shown
[Description of Notations]
1 Pole pillar partial case
2 Polar plate
2a Pole pillar
4 Bulking agent
5 Air bubbles

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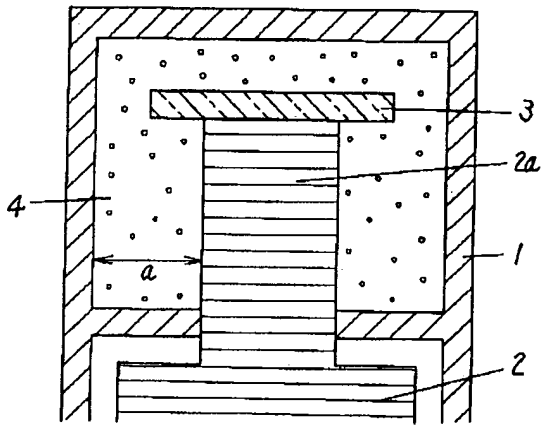
DRAWINGS

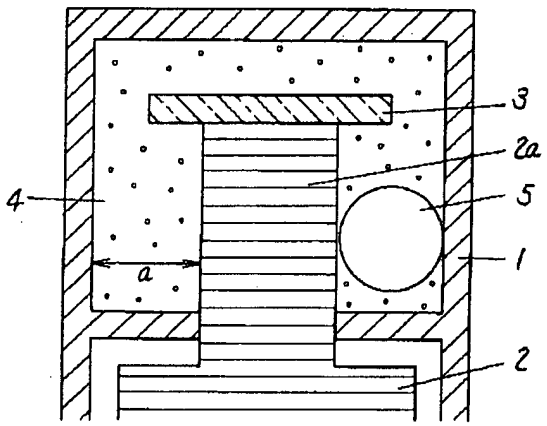
[Drawing 1]

1 極柱部分ケース
2 極板
2a 極柱
4 充填剤



[Drawing 2]

5 気泡



[Translation done.]

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-159758

(43)Date of publication of application : 25.06.1993

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(21)Application number : 03-317656

(22)Date of filing : 02.12.1991

(71)Applicant : MATSUSHITA ELECTRIC IND CO LTD

(72)Inventor : YOSHINO HARUMI
KOIKE KIICHI
JINBO HIROYUKI

(54) MANUFACTURE OF SEALED LEAD-ACID BATTERY

(57)Abstract:

PURPOSE: To provide a method for manufacturing a sealed lead-acid battery such as filling the periphery of a pole pillar sufficiently with a filler with no influence by viscosity of resin, peripheral temperature and humidity even when dimension of the periphery of the pole pillar of the battery is designed small, in the sealed lead-acid battery of type for sealing a pole pillar part, connected to a plate, with the filler of thermosetting resin.

CONSTITUTION: In a method for manufacturing a sealed lead-acid battery, in the case of sealing a part of a pole filler 2a, connected to a plate 2, with a filler 4 of quality such as viscosity 10Pa. s or more or a gel time 20 minutes or less difficult for the periphery of the pole pillar 20a sufficiently filled with the filler 4, the part of the pole pillar 2a is preheated before injecting the filler. In this way, the periphery of the pole pillar 2a is sufficiently filled with the filler.

Claim(s)]

[Claim 1] The manufacturing method of the sealing form lead accumulator which obturates said pole pillar part which more than 10Pa.s or the gelation time was the sealing form lead accumulator of the structure where viscosity obturates the pole pillar part connected to the plate at 25 degrees C, the thermosetting resin, i.e., the bulking agent, which is 20 or less minutes at 25 degrees C, and heated said pole pillar part beforehand and raised temperature before pouring in said bulking agent with said bulking agent.

[Claim 2] The manufacturing method of the sealing form lead accumulator according to claim 1 which raises the temperature of a pole pillar part to 40 degrees C - 100 degrees C temporarily by heating a pole pillar part before pouring in a bulking agent.

Detailed Description of the Invention]
[0001]
[Industrial Application] Especially this invention relates to the manufacturing method of the sealing form lead accumulator used for the power source of a noncommercial porter pull device etc. about the manufacturing method of a sealing form lead accumulator.
[0002]
[Description of the Prior Art] Many of sealing form lead accumulators are maintaining the seal nature of the pole pillar part which is a part which takes out the electrical and electric equipment from the interior of a cell by filling up a perimeter with a bulking agent. When the part which air bubbles etc. remain to the perimeter of a pole pillar, and is not filled up into it with a bulking agent exists, the obturation nature of a pole pillar part with the large part with which it does not fill up falls. Viscosity used the low long resin of the gelation time for the bulking agent so that it might harden, after the perimeter of a pole pillar was fully conventionally filled up with the thermosetting resin which is a bulking agent.
[0003]
[Problem(s) to be Solved by the Invention] However, in the conventional manufacturing method, viscosity is low, the gelation time was long, i.e., the condition that viscosity was low could adopt only long resin as a bulking agent before hardening, but not only the dependability of a pole pillar part but the ease of making on manufacture had to be enough taken into consideration, and had to choose the class of bulking agent. Moreover, since the viscosity of a bulking agent became high depending on surrounding temperature and humidity or moisture adhered to a pole pillar part, there was also a fault that the wettability to the case of the pole pillar of a bulking agent and a pole pillar part fell. Furthermore, in the design of a lead accumulator, dimension sufficient between a pole pillar and a pole pillar partial case needed to be secured so that air bubbles might not remain in the perimeter of a pole pillar. About a bulking agent with low viscosity, when the raw material of low molecular weight was used, cost was high, and when it diluted with a diluent too much, there was also a problem that bond strength and sulfuric-acid-proof nature fell.
[0004] This invention solves the above-mentioned conventional trouble, the width of face of selection of a bulking agent class is expanded, and effect of surrounding temperature and humidity is not received, but it aims at offering the manufacturing method of the sealing form lead accumulator which can make smaller the dimension between a pole pillar and a pole pillar partial case.
[0005]
[Means for Solving the Problem] In order to solve this technical problem, more than 10Pa.s or the gelation time is the sealing form lead accumulator of the structure where of viscosity obturates the pole pillar part connected to the plate at 25 degrees C, the thermosetting resin, i.e., the bulking agent, which is 20 or less minutes at 25 degrees C, and the manufacture approach of the sealing form lead accumulator by this invention carries out blockade opening of the pole pillar part which heated the pole pillar part beforehand and raised temperature with a bulking agent, before pouring in a bulking agent.
[0006]
[Function] Since it is maintained by the manufacturing method of this sealing form lead

accumulator while the temperature of a bulking agent has been high even if a bulking agent contacts the pole pillar section at the time of bulking agent impregnation, it becomes possible to raise the wettability of a bulking agent and a pole pillar part, and air bubbles etc. stop being able to remain easily. Moreover, in order to evaporate the excess water adhering to a pole pillar and a pole pillar partial case, the wettability over the bulking agent by the side of adherend also improves. Therefore, since restoration of a pole pillar part can be performed without air bubbles etc. remaining to the perimeter of a pole pillar even if viscosity is high or the gelation time uses a short bulking agent, the width of face of selection of a bulking agent becomes large. It becomes unnecessary therefore, to be able to choose a bulking agent class as a subject only for dependability, for low-cost-izing to be possible, to make [many] the addition of a diluent, and to reduce bond strength and sulfuric-acid-proof nature. Moreover, offer of the cell of pile structure of a bulking agent with the small dimension between a pole pillar and a pole pillar partial case is also attained around.

[0007]

[Example] Hereafter, the manufacturing method of the sealing form lead accumulator of one example of this invention is explained using a drawing.

[0008] Resin a, Resin b, and Resin c were used for the perimeter of pole pillar 2a connected to the plate 2 of the cell of structure as shown in drawing 1 as a bulking agent 4, and it made 2000 cels at a time as an experiment. Viscosity is [4.3Pa.s and the gelation time of Resin a] 15 minutes at 25 degrees C in 25 degrees C. Viscosity is [15Pa.s and the gelation time of Resin b] 30 minutes at 25 degrees C in 25 degrees C. Viscosity is [3.5Pa.s and the gelation time of Resin c] 40 minutes at 25 degrees C in 25 degrees C. Polypropylene with a thickness of 2.0mm was used as an ingredient of the sheathing object of a cell, and the pole pillar partial case 1. 3 is the connection parts of a terminal and a pole pillar. The cell of drawing 1 set die-length a between the pole pillar partial case 1 and pole pillar 2a to 1.0mm. About each resin, 100 cels left the cell for 30 minutes before bulking agent impregnation in 30, 40, 50, 60, 70, and 80 or 90,100,120-degree-C ambient atmosphere, respectively, and poured in the bulking agent 4 within 30 seconds after extraction. The bulking agent 4 kept it warm at 40 degrees C. Among these resin, conventionally, since viscosity is high, Resin b is resin which canceled adoption. About the 100 remaining cels, the cell was made as an experiment by the conventional approach. The cell made as an experiment deleted 30 cels of cross sections at a time, and calculated the percent defective by making into a defect that to which air bubbles 5 touch pole pillar 2a. An example to which air bubbles touch pole pillar 2a is shown in drawing 2 . About the 70 remaining cels, the heat shock trial was in the electrolytic solution of a pole pillar part operation and one month after, and existence of the liquid spill by stage fright was checked. The result of a cellular percent defective, the liquid-spill incidence rate after a heat shock trial, and the temperature of the pole pillar partial case 1 at the time of bulking agent impregnation is shown in Table 1. Although a heat shock trial differs from a real service condition, it is effective in performing the ratio of a result as an accelerated test.

[0009]

[Table 1]

加熱温度	充填剤注入時電池温度	加熱後外観	気泡不良率			ヒートショック試験後の液漏れ		
			樹脂a	樹脂b	樹脂c	樹脂a	樹脂b	樹脂c
加熱なし	20～25℃	問題なし	4/30	9/30	2/30	1/70	2/70	3/70
30℃	25～27℃	問題なし	2/30	5/30	1/30	1/70	1/70	3/70
40℃	33～35℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
50℃	40～44℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
60℃	47～51℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
70℃	53～55℃	問題なし	0/30	0/30	0/30	0/70	0/70	1/70
80℃	61～65℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
90℃	70～75℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
100℃	79～83℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
120℃	93～98℃	ｹｰｽ変形 2/300	0/30	0/30	0/30	0/70	0/70	0/70

[0010] According to the result of Table 1, in the case of 30 degrees C or less, a cellular residual is seen whenever [stoving temperature / of each resin]. Only in the case of 30 degrees C or less, in Resin a and Resin b, a liquid spill is seen after a heat shock trial whenever [stoving temperature]. All five cels was [the cellular residual of the pole pillar section of these cels] the causes. In Resin c, the liquid spill of a cause did not have air bubbles. Moreover, when heating exceeding 100 degrees C was performed, deformation of a resin case was seen.

[0011] Even if it used the bulking agent with high viscosity, and the short bulking agent of the gelation time by heating a pole pillar part beforehand before impregnation of a bulking agent by the above result also in a fuel cell subsystem with the small dimension between the pole pillars and the pole pillar partial cases 1 where many air bubbles remain by the conventional approach, the cell by which air bubbles do not remain around a pole pillar was able to be made. Therefore, it has checked that the width of face of selection of a bulking agent could obtain breadth and a cell with the more high obturation dependability of a pole pillar part. However, since the temperature of resin which can be heated changes with the class and grade of the resin of a case ingredient, it needs to be careful of whenever [stoving temperature] enough, and a fuel cell subsystem needs to determine it.

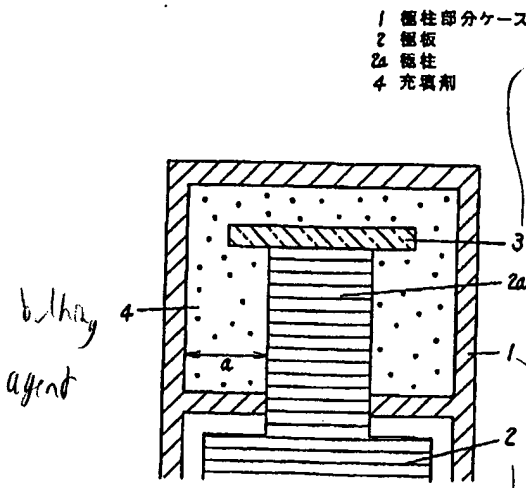
[0012]

[Effect of the Invention] Since it is maintained while the temperature of a bulking agent has been high even if the bulking agent at the time of bulking agent impregnation

contacts the pole pillar section by explanation of the above example according to the manufacturing method of the sealing form lead accumulator of this invention so that clearly, viscosity becomes possible [injecting a bulking agent into a pole pillar part in the low condition], and since the wettability of a pole pillar and a bulking agent improves, ****** etc. stops being able to remain easily. Moreover, in order to evaporate the excess water adhering to a pole pillar and a pole pillar partial case, the wettability over the bulking agent by the side of adherend also improves. Since restoration of a pole pillar part can be performed without air bubbles etc. remaining to the perimeter of a pole pillar even if viscosity is high or the gelation time uses a short bulking agent, it becomes unnecessary therefore, to attain breadth and low cost-ization of the width of face of selection of a bulking agent, and to make [many] a diluent addition, and to reduce bond strength and sulfuric-acid-proof nature. Moreover, offer of the cell of pile structure of a bulking agent with the small dimension between a pole pillar and a pole pillar partial case is also attained around.

[Brief Description of the Drawings]
[Drawing 1] The sectional view near the pole pillar part of the cell in the manufacturing method of the sealing form lead accumulator of one example of this invention
[Drawing 2] The sectional view near the pole pillar part of the cell in which an example to which air bubbles touch the pole pillar in the manufacturing method of the conventional sealing form lead accumulator is shown
[Description of Notations]
1 Pole Pillar Partial Case
2 Plate
2a Pole pillar
4 Bulking Agent
5 Air Bubbles

【図1】


1 極柱部分ケース
2 極板
2a 極柱
4 充填剤
3
2a
4
a
1
2

【図2】

5 気泡
connection parts of terminal & pole pillar
3
2a pole pillar
filler 4
5 air bubbles
a
1 pole pillar partial case
2 plate
bulking agent
plate
pole pillar
pole pillar partial case

MANUFACTURE OF SEALED LEAD-ACID BATTERY

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Publication date: 1993-06-25
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- European:
Application number: JP19910317656 19911202
Priority number(s): JP19910317656 19911202

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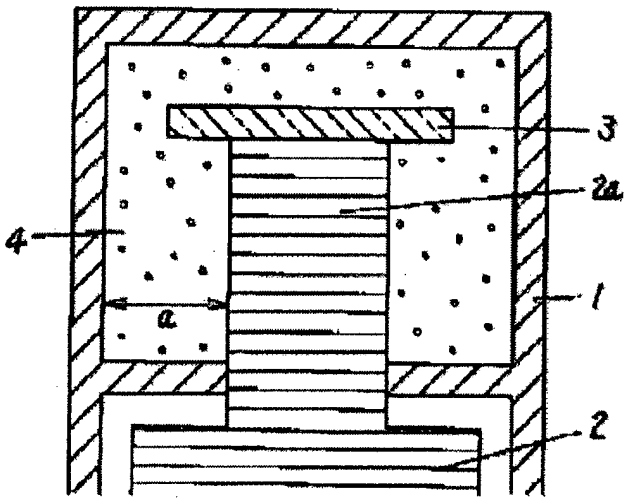
Abstract of **JP5159758**

PURPOSE:To provide a method for manufacturing a sealed lead-acid battery such as filling the periphery of a pole pillar sufficiently with a filler with no influence by viscosity of resin, peripheral temperature and humidity even when dimension of the periphery of the pole pillar of the battery is designed small, in the sealed lead-acid battery of type for sealing a pole pillar part, connected to a plate, with the filler of thermosetting resin. CONSTITUTION:In a method for manufacturing a sealed lead-acid battery, in the case of sealing a part of a pole filler 2a, connected to a plate 2, with a filler 4 of quality such as viscosity 10Pa. s or more or a gel time 20 minutes or less difficult for the periphery of the pole pillar 20a sufficiently filled with the filler 4, the part of the pole pillar 2a is preheated before injecting the filler. In this way, the periphery of the pole pillar 2a is sufficiently filled with the filler.



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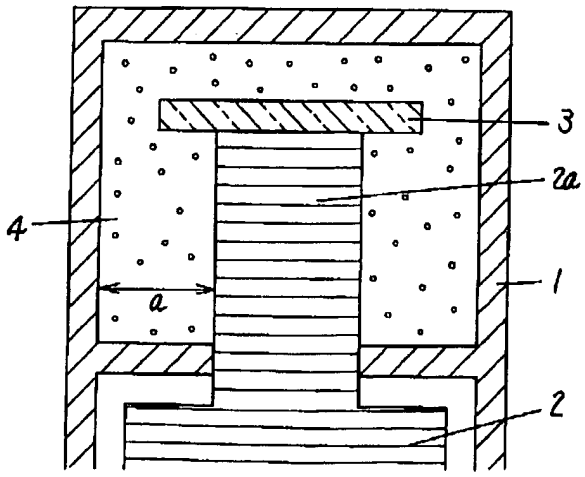
(54)【発明の名称】　密閉形鉛蓄電池の製造法

(57)【要約】

【目的】　極板に接続された極柱部分を、熱硬化性樹脂の充填剤で封口する方式の密閉形鉛蓄電池において、極柱周囲の寸法が小さい設計の電池においても、樹脂の粘度や周囲温度・湿度に影響されることなく十分に充填剤が極柱周囲に充填されるような密閉形鉛蓄電池の製造法を提供することを目的とする。

【構成】　本発明による密閉形鉛蓄電池の製造法は、極板２に接続された極柱２ａ部分を、粘度が１０Ｐａ．ｓ以上もしくはゲル化時間が２０分以下であるような極柱２ａ周囲に充填剤４が十分に充填しにくい性質の充填剤４で封口する場合、充填剤注入前にあらかじめ極柱２ａ部分を加熱することによって、十分に充填剤が極柱２ａ周囲に充填されるようにしたものである。

1　極柱部分ケース
2　極板
2a　極柱
4　充填剤



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【特許請求の範囲】

【請求項1】　極板に接続された極柱部分を、粘度が25℃で10Pa．s以上もしくはゲル化時間が25℃で20分以下である熱硬化性樹脂すなわち充填剤で封口する構造の密閉形鉛蓄電池であって、前記充填剤を注入する前にあらかじめ前記極柱部分を加熱して温度を上げた前記極柱部分を、前記充填剤で封口する密閉形鉛蓄電池の製造法。

【請求項2】　充填剤を注入する前に、極柱部分を加熱することによって、極柱部分の温度を40℃～100℃に一時的に上げる請求項1記載の密閉形鉛蓄電池の製造法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は密閉形鉛蓄電池の製造法に関し、特に民生用ポータブル機器などの電源に使用される密閉形鉛蓄電池の製造法に関する。

【0002】

【従来の技術】密閉形鉛蓄電池の多くは、電池の内部より電気を取り出す部分である極柱部分のシール性を、充填剤を周囲に充填することで保っている。極柱周囲に気泡などが残留し充填剤で充填されない部分が存在するような場合には、充填されない部分が大きい極柱部分の封口性が低下する。従来は、充填剤である熱硬化性樹脂が十分に極柱周囲に充填されてから硬化するように、充填剤には粘度が低くゲル化時間の長い樹脂を用いていた。

【0003】

【発明が解決しようとする課題】しかし、従来の製造法では、粘度が低くゲル化時間が長い、すなわち硬化前に粘度の低い状態が長い樹脂しか充填剤として採用できず、極柱部分の信頼性のみならず製造上の作りやすさも十分考慮して充填剤の種類を選択しなければならなかった。また、周囲の温度・湿度によっては、充填剤の粘度が高くなったり極柱部分に水分が付着したりするため、充填剤の極柱および極柱部分のケースへのぬれ性が低下するという欠点もあった。さらに、鉛蓄電池の設計においては、極柱周囲に気泡の残らないように、極柱と極柱部分ケースの間に十分な寸法を確保する必要があった。粘度の低い充填剤については、低分子量の原料を用いた場合はコストが高く、希釈剤で過度に希釈した場合は接着強度および耐硫酸性が低下するという問題もあった。

【0004】本発明は上記従来の問題点を解決するもので、充填剤種類の選択の幅を広げ、周囲の温度・湿度の影響をうけず、極柱と極柱部分ケースの間の寸法をより小さくすることが可能な密閉形鉛蓄電池の製造法を提供することを目的とする。

【0005】

【課題を解決するための手段】この課題を解決するために、本発明による密閉形鉛蓄電池の製造方法は、極板に接続された極柱部分を、粘度が25℃で10Pa．s以上もしくはゲル化時間が25℃で20分以下である熱硬化性樹脂すなわち充填剤で封口する構造の密閉形鉛蓄電池であって、充填剤を注入する前にあらかじめ極柱部分を加熱して温度を上げた極柱部分を充填剤で封鎖口するものである。

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【0006】

【作用】この密閉形鉛蓄電池の製造法により、充填剤注入時に充填剤が極柱部に接触しても充填剤の温度が高いまま保たれるために、充填剤と極柱部分のぬれ性を向上させることが可能となり、気泡などは残留しにくくなる。また、極柱および極柱部分ケースに付着している水分を飛ばすため、被着体側の充填剤に対するぬれ性も向上する。したがって、粘度が高いかもしくはゲル化時間が短い充填剤を使用しても極柱周囲に気泡などが残留することなく極柱部分の充填ができるので、充填剤の選択の幅が広くなる。したがって、信頼性のみを主体に充填剤種類を選択でき、低コスト化が可能であり、希釈剤の添加量を多くして接着強度および耐硫酸性を低下させる必要もなくなる。また、極柱と極柱部分ケースの間の寸法が小さい充填剤がまわりにくい構造の電池の提供も可能となる。

【0007】

【実施例】以下、本発明の一実施例の密閉形鉛蓄電池の製造法について図面を用いて説明する。

【0008】図1に示すような構造の電池の極板2に接続された極柱2aの周囲に、充填剤4として樹脂a，樹脂b，樹脂cを用いて2000セルずつ試作を行った。樹脂aは25℃で粘度が4．3Pa．s、ゲル化時間が25℃で15分である。樹脂bは25℃で粘度が15Pa．s、ゲル化時間が25℃で30分である。樹脂cは25℃で粘度が3．5Pa．s、ゲル化時間が25℃で40分である。電池の外装体および極柱部分ケース1の材料としては厚さ2．0㎜のポリプロピレンを用いた。3は端子と極柱の接続部分である。図1の電池は極柱部分ケース1と極柱2aの間の長さaを1．0㎜にした。それぞれの樹脂について、100セルは充填剤注入前に電池をそれぞれ30，40，50，60，70，80，90，100，120℃雰囲気中に30分間放置し、取り出し後30秒以内に充填剤4の注入を行った。充填剤4は40℃に保温しておいた。これらの樹脂のうち、樹脂bは、従来は粘度が高いために採用をとりやめた樹脂である。残りの100セルについては従来の方法で電池を試作した。試作した電池は30セルずつ断面をけずり、極柱2aに気泡5が接触しているものを不良として不良率を計算した。極柱2aに気泡が接触している一例を図2に示す。残りの70セルについては、ヒートショック試験を実施、一ヶ月後に極柱部分の電解液はいあがりによる液漏れの有無の確認を行った。気泡不良率とヒートショック試験後の液漏れ発生率および充填剤注入時の極柱部分ケース1の温度の結果を表1に示す。ヒート

ショック試験は実使用条件とは異なるが、加速試験として結果の比率を行うには有効である。

＊【0009】

＊　【表1】

加熱温度	充填剤注入時電池温度	加熱後外観	気泡不良率			ヒートショック試験後の液漏れ		
			樹脂a	樹脂b	樹脂c	樹脂a	樹脂b	樹脂c
加熱なし	20～25℃	問題なし	4/30	9/30	2/30	1/70	2/70	3/70
30℃	25～27℃	問題なし	2/30	5/30	1/30	1/70	1/70	3/70
40℃	33～35℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
50℃	40～44℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
60℃	47～51℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
70℃	53～55℃	問題なし	0/30	0/30	0/30	0/70	0/70	1/70
80℃	61～65℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
90℃	70～75℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
100℃	79～83℃	問題なし	0/30	0/30	0/30	0/70	0/70	0/70
120℃	93～98℃	ケース変形　2/300	0/30	0/30	0/30	0/70	0/70	0/70

【0010】表1の結果によれば、それぞれの樹脂の、加熱温度30℃以下の場合において気泡残留がみられる。樹脂a，樹脂bにおいては加熱温度30℃以下の場合のみヒートショック試験後に液漏れがみられる。これらのセルは5セルとも極柱部の気泡残留が原因であった。樹脂cにおいては、気泡が原因の液漏れはなかった。また、100℃を越えた加熱を行った場合には樹脂ケースの変形がみられた。

【0011】以上の結果により、従来の方法では気泡が多く残留してしまうような、極柱と極柱部分ケース1の間の寸法の小さい電池系においても、充填剤の注入前にあらかじめ極柱部分を加熱することによって、粘度の高い充填剤やゲル化時間の短い充填剤を用いても、極柱周辺に気泡の残留することのない電池を作ることができた。したがって、充填剤の選択の幅が広がり、より極柱部分の封口信頼性の高い電池を得られることが確認できた。ただし、樹脂の加熱可能温度はケース材料の樹脂の種類・グレードによって異なるため、電池系によって加熱温度は十分注意して決定する必要がある。

【0012】

【発明の効果】以上の実施例の説明により明らかなように、本発明の密閉形鉛蓄電池の製造法によれば、充填剤注入時の充填剤が極柱部に接触しても充填剤の温度が高いまま保たれる為に、粘度が低い状態で充填剤を極柱部分に注入することが可能となり、極柱と充填剤のぬれ性が向上するため気泡胞などは残留しにくくなる。また、極柱および極柱部分ケースに付着している水分を飛ばすため、被着体側の充填剤に対するぬれ性も向上する。したがって、粘度が高いかもしくはゲル化時間が短い充填剤を使用しても極柱周囲に気泡などが残留することなく極柱部分の充填ができるので、充填剤の選択の幅が広がり、低コスト化が可能となり、また希釈剤添加量を多くして接着強度や耐硫酸性を低下させる必要もなくなる。また、極柱と極柱部分ケースの間の寸法が小さい充填剤がまわりにくい構造の電池の提供も可能となる。

【図面の簡単な説明】

【図1】本発明の一実施例の密閉形鉛蓄電池の製造法における電池の極柱部分の近傍の断面図

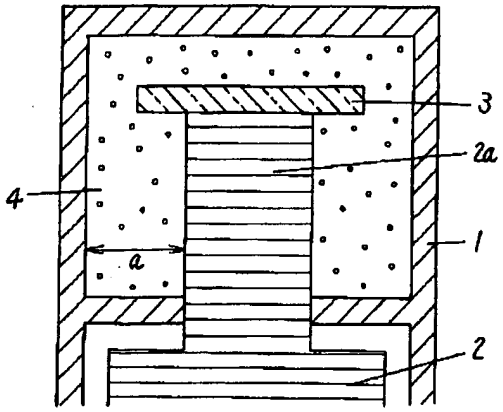
【図2】従来の密閉形鉛蓄電池の製造法における極柱に気泡が接触している一例を示す電池の極柱部分近傍の断面図

【符号の説明】

1　極柱部分ケース
2　極板
2a　極柱
4　充填剤
5　気泡

【図1】

1 極柱部分ケース
2 極板
2a 極柱
4 充填剤



【図2】

5 気泡